

# Development of Automated Room Security System

Saksham Rastogi<sup>1\*</sup>, Rahul Das<sup>2</sup>, Kriti<sup>3</sup>

Department of Electronics & Instrumentation, Galgotias College of Engg. & Tech, Greater Noida, Uttar Pradesh, India

**Abstract**—The work on “Development of automated room security system” using Microcontroller is a reliable circuit that takes over the task of security of a room very accurately. When somebody enters into the room then the count will be incremented by one and the set limit is checked, if the count is less than the set limit then the door opens and the person is granted access. When any one leaves the room then count will be decremented by one. If the total count exceeds the set limit then the buzzer is sound and the image of the person trying to enter the room is captured via a camera. The microcontroller does the above job. It receives the signals from the sensors, and this signal is operated under the control of software which is stored in ROM. 89s51 Microcontroller continuously monitor the sensors, an IR Sensor sends signal to the microcontroller, to increment or decrement the count accordingly. The system includes IR sensor, microcontroller, LCD, display, buzzer, camera and a 12v power is supplied to run the system. The system uses a compact circuitry built around 89s51 microcontroller programs are developed in Embedded C.

**Keywords**—89s51 microcontroller, Infrared sensors (IR sensors), LCD display, Embedded C.

## I. INTRODUCTION

Concept of this project is very useful in all modern classrooms, auditorium, where we want to restrict the number of person to enter in the room. Just insert the maximum count and leave all the work for smart microcontroller system.

Microcontroller system not only display the total person in the room but also the maximum limit. As the limit is over connected door is closed and buzzer turns on for a time when any person tries to enters in the room. Add on feature of this project is to show the image of the person entering the room via a camera. Moreover there will be an automatic light detecting sensor as whenever a person is inside the room the lights and fan would be switched on automatically. There will be additional fire detector in order to detect fire for safety reasons. Logic behind this project is to count the total person entering and exiting from the room with the help of the infra-red interruption sensor. In this project we use 89s51 controller with one 2by 16 lcd and wire CCTV camera.

## II. PROPOSED DESIGN

In this system, the traffic or agents or human follow a certain route or door or some threshold to enter into and to exit from the place. While entering to the system, there are two sensors are installed which are connected with each other via infra red network. While a visitor crosses the infrared bar or line, it is disconnected and at that time microcontroller increases its count by one. The count is shown on the lcd. When someone crosses the bar in opposite direction, the infrared line is again interrupted and then microcontroller decreases its count by one to signify that one visitor is entered and one is get away from the place.

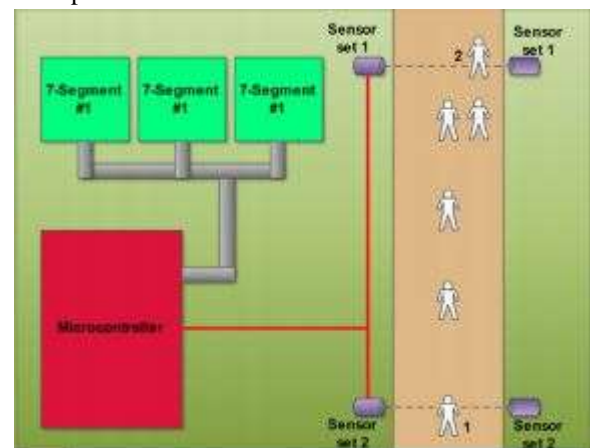


Fig.1: Block diagram of Bidirectional Visitor Counter

In the above figure, the person at place 1, first crosses the infrared line and when crosses, it breaks. The count is then shown on 7-Segment display like follows:



Fig.2: Count Increment

When person at place 2, crosses the infrared network or when the first person goes and breaks it, the count is decreased by one and the output is shown below:



Fig.3: Count Decrement

After the increment decrement of the counter there is automated light control system using IR Sensor and microcontroller .This system is designed by using two sets of IR transmitter and receiver. As the microcontroller receives the output from the IR sensor, the current value of the persons inside the room gets altered, and accordingly if the current value of the persons inside the room is greater than 0 then the lights and fan are turned on else the lights and fan are switched off.

An additional feature to ensure safety along with the security fire detector system is used .Here we use a thermistor, whose resistance is dependent on the temperature. The thermistor is connected to a voltage comparator, in case of fire the resistance of the thermistor decreases and the output of the voltage comparator goes active low. The microcontroller on receiving an active low signal from the comparator , activates the alarm and the door is opened.



Fig.4: Thermistor

### III. BLOCK DIAGRAM

The following figure shows the block diagram for automated room security system, thereby giving a vivid sequence of the hardware parts connected.

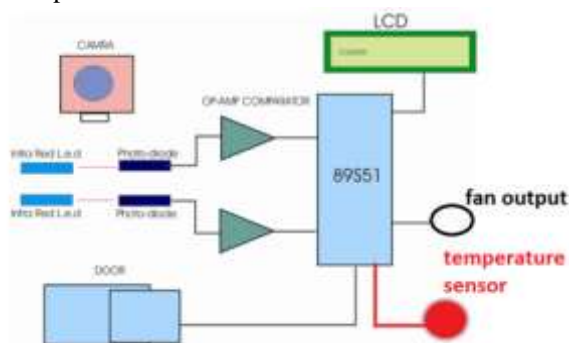


Fig.4: Block Diagram

### IV. SOFTWARE IMPEMENTATION

For software realization in this research work, software named Keil is used.  $\mu$ Vision4 incorporated improvement atmosphere that summarized a development supervisor, built capability, device design, editor and a grateful debugger.  $\mu$ Vision4 is used to write down and assemble the programs via the apparatus. It could move the assembly language as well as C code into the hex file. . Keil software consists of the following: Linker Control File – It is a text file that  $\mu$ Vision surpasses to the linker. The control file consists of all information, names of object files and library files to comprise in the output file. Map File – The map file is a listing file created by the linker. Project Target – In an assignment, a target is an executable program that is generated. A project may create an aim that runs on an 8051 family. Plans might be produced to build with no optimization and to make with entire optimization. Source File Group – In a scheme, a group is a number of source files that compose the project target. Although we may individually specify the toolset options for a file, a group lets us to apply the same options to a group of source files. The choice for a set might be various since the choice for the aim. Toolsets – A toolset consist of an assembler, compiler, linker, HEX converter, debugger and the other related tools for a picky device family like the 8051. Every tool or program in a toolset is dedicated to build mark code for a detailed family of chips. To guesstimate the software for correct method, the case was planned hooked on the microcontroller on the significant maturity board. Encoding of the microcontroller is accomplished via the Universal Programmer. It is a handy serial programmer. These accede to hexadecimal files to be burdened into the microcontroller. Mainly the microcontroller is planned by exterminating it since the hole on the board and bringing in it into the multi-pin hole on the programmer. Microcontroller next to with it's an assortment of edges rivet software to work on.



Fig.5: Flowchart

## V. CIRCUIT DIAGRAM

The below shows the circuit diagram of the proposed system.

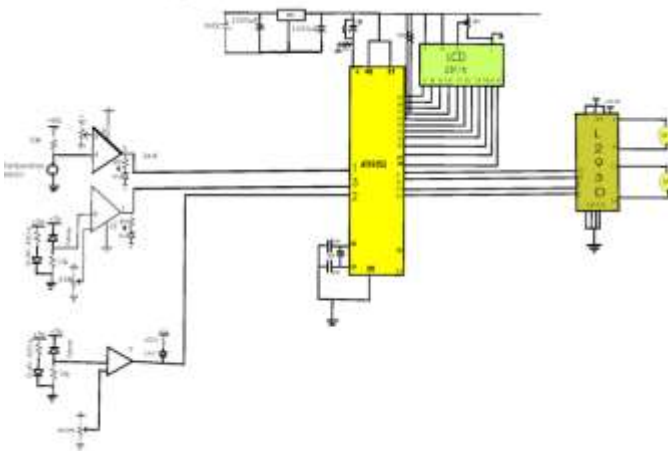


Fig.6: Circuit Diagram

The following are the hardware requirements:

1) **Microcontroller:** The AT89S52 is a low-power, high-performance CMOS 8-bit microcontroller with 8KBytes of in-system programmable Flash memory. The appliance is feigned using Atmel's high-density non-volatile memory skill and is companionable with the industry-standard 80C51

training set and pin out. The on-chip flare permits the program memory to be reprogrammed in-system or by a conventional non-volatile memory programmer. By combining a versatile 8-bit CPU with in-system programmable Flash on a monolithic chip, the Atmel AT89S52 is a powerful microcontroller which provides a highly-flexible and cost-effective solution to many embedded control applications. The AT89S52 provides the following standard features: 8K bytes of flash, 256 bytes of RAM, 32 I/O lines, Watchdog timer, two data pointers, three 16-bit timer/counters, a Six-vector two-level interrupt architecture, a full duplex serial port, on-chip oscillator, Down to zero frequency and supports two software selectable power saving modes: Low-power Idle and Power down Modes.



Fig.7: Microcontroller

2) **IR Sensor:** It is the device which is utilized to detect the nearness, nonappearance, separation of the protest or intrusion. There are two sections the IR photoelectric sensor named light transmitter and photoelectric receiver. IR sensor detects the question by utilizing infrared beams between light transmitter and photoelectric receiver. These sensors as 'non-normal eyes' are natural to the computerization innovation. These sensors are mounted in side design in the project. The working guideline of the utilized sensor is that when the beam transmitted by the producer is blocked or mostly reflected by the object, the bar recipient whereby makes a judgments and responds.



Fig.8: IR LED (Tx &amp; Rx)

## VI. WORKING OT THE PROJECT

Automated room security system is basically an automated movable barrier which is installed at the entry of an authorized room where unauthentic entry are restricted. The project is basically made with the help of AT89s52 microcontroller .In this gear mechanism is used followed by L293D motor driver and dc gear motor of 60rpmare used to

provide ease of opening as well as closing the door. In order to sense the presence of person bidirectional infrared sensor are used followed by the counter in order to count the presence of people inside the room and display the same with the help of LCD installed in the project. This system works on the principle of breaking an infrared beam of light, sensed by a photodiode. It consists of two transmitting infrared diodes and two receiving photodiodes. The first one is when someone coming in and the second one is used someone going out of the room. The photodiodes are connected to comparators, which give a lower output as soon as the beam is broken and high output when they are transmitting normally. Along with security optimum energy usage has also being done with the help of IR sensors counter. As light and fan will automatically start working as soon as it will sense any presence and will automatically switch off if no presence will be detected. Apart from this Thermistor NTC103 has being used for fire safety purpose, as soon as it will detect heat the automated door will open for easy and fast evacuation and a buzzer of 3v is switched on used for awareness purpose. To monitor the whole ongoing process a CCTV has also being used for surveillance thus ensuring more security.

## VII. CONCLUSION

The framework proposed in this paper is presently under research for the improvement in future understanding. The most vital parts of the framework are the remote numbering and the forefront security. These two elements makes the framework idealize, also the cost will low as no expensive parts are utilized for the development of the framework.

## VIII. FUTURE SCOPE

Keeping in mind the end goal to expand the security of this proposed mechanized room security framework the remote camera with GSM framework could be joined in which the unapproved people data would straightforwardly be send to the worry division ,subsequently expanding greater security.

## REFERENCES

- [1] Ciubotaru-Petrescu, B., Chiciudean, D., Cioarga, R., & Stanescu, D. (2006), "Wireless Solutions for Telemetry in Civil Equipment and Infrastructure Monitoring", 3rd Romanian-Hungarian Joint Symposium on Applied Computational Intelligence (SACI) May 25-26, 2006.
- [2] Kalpakjian (2008), "Automation in Manufacturing. Manufacturing processes for Engineering Materials", 5th Ed.,

PearsonEducationhttp://nd.edu/~manufact/MPEM%20pdf\_files/Ch14.pdf

- [3] Potamitis, I., Georgila, K., Fakotakis, N., & Kokkinakis, G. (2003), "An integrated system for smart-home control of appliances based on remote speech interaction", EUROSPEECH 2003, 8th European Conference on Speech Communication and Technology, Geneva, Switzerland, Sept. 1-4, 2003, pp. 2197-2200.
- [4] Zungeru, A.M. et al., (2012). Design and Implementation of a Low Cost Digital Bus Passenger Counter. Innovative Systems Design and Engineering, 3(4), pp. 29-41.